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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,458	08/30/2001	Dwight D. Weller	50450-8038.US00	9454
22918	7590	10/08/2003	EXAMINER	
CHAKRABARTI, ARUN K				
PERKINS COIE LLP P.O. BOX 2168 MENLO PARK, CA 94026			ART UNIT	PAPER NUMBER

1634

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**Application No.  
**09/943,458**Applicant(s)  
**Weller**Examiner  
**Arun Chakrabarti**Art Unit  
**1634**

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (36 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Sep 3, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 15-27 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 15-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 6) ☒ Other: Detailed Action

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## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 3, 2003 has been entered.

### ***Specification***

2. Claim 1 and 19 have been amended.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995).

Summerton et al inherently teach a method of separating a population of duplexes comprising oligomeric analyte molecules, wherein the molecules are composed of linked subunits

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of which at least 90% are uncharged, and are able to hybridize via Watson-Crick base pairing with a specific probe molecule which is a nucleic acid or charged nucleic acid analog (Abstract and Claims 19-21) (this inherency is deduced from the fact that duplex oligomeric analyte molecules, which are being purified in this case, are made of uncharged backbones with 5- or 6-membered cyclic backbone structures as explicitly taught by Summerton et al in the abstract), the method comprising:

(a) applying to a charge-bearing separation medium a mixture of (i) the population of analyte molecules and (ii) the probe molecule, under conditions such that complementary or near-complementary regions of the probe and at least one such analyte molecule are stably hybridized, thereby forming a mixture of species selected from probe-analyte duplex, single stranded analyte, single stranded probe, and combinations thereof (Claims 1 and 19-21), and

(b) inherently separating the duplexes from each other and from single stranded species within the medium (Claims 1 and 19-21).

Summerton et al teach a method, wherein the nucleotide sequence of each analyte molecule is selected from a selected sequence (Claims 1 and 19-21 and Abstract).

Summerton et al. teach a method, further comprising the step of isolating at least one duplex (Claims 1 and 19-21 and Abstract).

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***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 3-6, 10, 12-13, 15, and 18-26 is rejected under 35 U.S.C. 103(a) as being obvious over Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) (July 23, 1991).

Summerton et al (U.S. Patent 5,405,938) teach the method of claims 1, 2, and 27 as described above.

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the deletion, insertion or mutation variants contain at most one such deletion, insertion or mutation per 8 nucleotides of the selected sequence.

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Summerton et al (U.S. Patent 5,034,506) inherently teach a method, wherein the deletion, insertion or mutation variants contain at most one such deletion, insertion or mutation per 8 nucleotides of the selected sequence (Column 13, lines 46-48 and Examples 18-21).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the probe has a length and a sequence such that its duplexes with different analyte molecules differ with respect to the presence, length or position of an unhybridized portion of the nucleic acid.

Summerton et al (U.S. Patent 5,034,506) inherently teach a method, wherein the probe has a length and a sequence such that its duplexes with different analyte molecules differ with respect to the presence, length or position of an unhybridized portion of the nucleic acid (Example 19, Column 33, lines 22-39, Example 20, Column 34, lines 22-49, and Example 21, Column 35, lines 41-49 and Figure 16).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the probe includes a sequence complementary to the selected sequence.

Summerton et al (U.S. Patent 5,034,506) teach a method, wherein the probe includes a sequence complementary to the selected sequence (Example 19, Column 33, lines 22-39, Example 20, Column 34, lines 22-49, and Example 21, Column 35, lines 41-49 and Figure 16).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein variations in sequence or length among the analyte molecule occur within a given subregion of the selected sequence, and the probe is effective to stably hybridize to the subregion under the conditions of the analysis.

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Summerton et al (U.S. Patent 5,034,506) inherently teach a method, wherein variations in sequence or length among the analyte molecule occur within a given subregion of the selected sequence, and the probe is effective to stably hybridize to the subregion under the conditions of the analysis (Example 19, Column 33, lines 22-39, Example 20, Column 34, lines 22-49, and Example 21, Column 35, lines 41-49 and Figure 16).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the subregion is at or near a terminus of the analyte molecule.

Summerton et al (U.S. Patent 5,034,506) inherently teach a method, wherein the subregion is at or near a terminus of the analyte molecule (Figure 16).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the terminus is the 5' or 3' terminus of the analyte molecule and the probe comprises a labeling moiety at its 5' or 3' terminus.

Summerton et al (U.S. Patent 5,034,506) inherently teach a method, wherein the terminus is the 5' or 3' terminus of the analyte molecule and the probe comprises a labeling moiety at its 5' or 3' terminus (Column 14, lines 55-68).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the charge bearing support is an ion exchange medium, and the separating step comprises passing an eluant through the medium.

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Summerton et al (U.S. Patent 5,034,506) inherently teach a method, wherein the charge bearing support is an ion exchange medium, and the separating step comprises passing an eluant through the medium (Column 12, line 65 to column 13, line 6).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein all of the subunits of the morpholino oligomers analyte molecules are uncharged.

Summerton et al (U.S. Patent 5,034,506) teach a method, wherein all of the subunits of the morpholino oligomers analyte molecules are uncharged (Abstract, Figures 1-3 and Column 3, line 1 to column 6, line 55).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the morpholino oligomers have intersubunit linkages selected from the group consisting of phosphoramidate and phosphordiamidate.

Summerton et al (U.S. Patent 5,034,506) teach a method, wherein the morpholino oligomers have intersubunit linkages selected from the group consisting of phosphoramidate and phosphordiamidate (Abstract, Figures 1-3 and Column 3, line 1 to column 6, line 55).

Summerton et al (U.S. Patent 5,405,938) do not teach the method, wherein the probe is selected from DNA.

Summerton et al (U.S. Patent 5,034,506) teach a method, wherein the probe is selected from DNA (Example 19, Column 33, lines 22-39, Example 20, Column 34, lines 22-49, and Example 21, Column 35, lines 41-49).



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Summerton et al (U.S. Patent 5,405,938) do not teach the method, further comprising the step of isolating, detecting and quantitating a duplex of the labeled probe with at least one target analyte molecule in the population.

Summerton et al (U.S. Patent 5,034,506) teach a method, further comprising the step of isolating, detecting and quantitating a duplex of the labeled probe with at least one target analyte molecule in the population (Example 19, Column 33, lines 22-39, Example 20, Column 34, lines 22-49, and Example 21, Column 35, lines 41-49 and Column 15, lines 34-50).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the method of separating a population of duplexes comprising oligomeric analyte molecules of Summerton et al (U.S. Patent 5,405,938) in the method of Summerton et al. (U.S. Patent 5,034,506), since Summerton et al (U.S. Patent 5,405,938) state, "The present invention further includes methods for isolating, from a liquid sample, a target duplex nucleic acid fragment having a selected sequence of base-pairs (Abstract, last sentence)." By employing scientific reasoning, an ordinary practitioner would have been motivated to combine and substitute the method of separating a population of duplexes comprising oligomeric analyte molecules of Summerton et al (U.S. Patent 5,405,938) in the method of Summerton et al. (U.S. Patent 5,034,506), in order to improve the process for analyzing a population of oligomeric analyte molecules and also in order to achieve the express advantages, as noted by Summerton et al (U.S. Patent 5,405,938), of an invention which

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provides a method for isolating, from a liquid sample, a target duplex nucleic acid fragment having a selected sequence of base-pairs.

Summerton et al (U.S. Patent 5,405,938) in view of Summerton et al. (U.S. Patent 5,034,506) (July 23, 1991) do not teach the method wherein the probe has a length equal to or no more than 25% greater than the selected sequence.

However, it is *prima facie* obvious that selection of the specific probe length of a nucleic acid hybridization reaction represent routine optimization with regard to sequence, length and compositions of the DNA sequences being screened as well as the size and sequence of the probe molecule and the requirement of screening speed which routine optimization parameters are explicitly recognized to an ordinary practitioner in the relevant art. As noted *In re Aller*, 105 USPQ 233 at 235,

More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.

Routine optimization is not considered inventive and no evidence has been presented that the specific probe length of a nucleic acid hybridization reaction performed was other than routine, that the products resulting from the optimization have any unexpected properties, or that the results should be considered unexpected in any way as compared to the closest prior art.

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7. Claims 7-9, and 11 are rejected under 35 U.S.C. 103(a) over Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) (July 23, 1991) in view of Connolly et al. (U.S. Patent 6,342,370 B1) (January 29, 2002).

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) teach method of claims 1-6, 10, 12-13, 15, and 18-27 as described above.

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) do not teach the method, wherein the probes comprise deletion variant sequences.

Connolly et al. teach the method, wherein the probes comprise deletion variant sequences (Column 4, line 42 to column 5, line 21).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the method, wherein the probes comprise deletion variant sequences of Connolly et al. in the method of Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506), since Connolly et al. state, "There is provided a method of diagnosing a disease or a susceptibility to a disease related to a mutation in the nucleic acid sequence and the proteins encoded by such nucleic acid sequence (Column 2, lines 46-50)." By employing scientific reasoning, an ordinary practitioner would have been motivated to combine and substitute the method, wherein the probes comprise deletion variant sequences of Connolly et al. in the method of Summerton et al. (U.S. Patent

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5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506), in order to improve the process for analyzing a population of oligomeric analyte molecules and also in order to achieve the express advantages, as noted by Connolly et al., of an invention which provides a method of diagnosing a disease or a susceptibility to a disease related to a mutation in the nucleic acid sequence and the proteins encoded by such nucleic acid sequence.

8. Claim 16 is rejected under 35 U.S.C. 103(a) over Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) (July 23, 1991) in view of Gilmanshin et al. (U.S. Patent 6,263,286 B1) (July 17, 2001).

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) teach the method of claims 1-6, 10, 12-13, 15, and 18-27 as described above.

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) do not teach the method, wherein the labeling moiety is a fluorescent label.

Gilmanshin et al. teach the method, wherein the labeling moiety is a fluorescent label. (Column 20, line 7 to column 26, line 43).

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) do not teach the method, wherein the charge bearing support is an electrophoresis medium, and the separating of step (b) comprises applying an electric field between opposing boundaries of the medium.

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Gilmanshin et al. teach the method, wherein the charge bearing support is an electrophoresis medium, and the separating of step (b) comprises applying an electric field between opposing boundaries of the medium (Column 19, lines 12-24).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the method, wherein the labeling moiety is a fluorescent label and wherein the charge bearing support is an electrophoresis medium, and the separating of step (b) comprises applying an electric field between opposing boundaries of the medium of Gilmanshin et al. in the method of Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506), since Gilmanshin et al. state, "The opportunity for multiple use of the same sample in the methods of the invention either to enhance statistics or for complementary analyses allows the use of small amounts of sample (potentially down to the single molecule level) for elaborate analyses (Column 19, lines 36-41)." By employing scientific reasoning, an ordinary practitioner would have been motivated to combine and substitute the method, wherein the labeling moiety is a fluorescent label and wherein the charge bearing support is an electrophoresis medium, and the separating of step (b) comprises applying an electric field between opposing boundaries of the medium of Gilmanshin et al. in the method of Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506), in order to improve the process for analyzing a population of oligomeric analyte molecules and also in order to achieve the express advantages, as noted by Gilmanshin et al., of an invention which provides the opportunity for multiple use of the same sample to enhance

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statistics or for complementary analyses which allows the use of small amounts of sample (potentially down to the single molecule level) for elaborate analyses.

9. Claim 17 is rejected under 35 U.S.C. 103(a) over Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) (July 23, 1991) further in view of Gilmanshin et al. (U.S. Patent 6,263,286 B1) (July 17, 2001) further in view of Hearn et al. (U.S. Patent 4,279,724) (July 21, 1981).

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) in view of Gilmanshin et al. teach method of claims 1-6, 10, 12-16 and 18-27 as described above.

Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) in view of Gilmanshin et al. do not teach the method, wherein the medium includes a superimposed pH gradient.

Hearn et al. teach the method, wherein the medium includes a superimposed pH gradient (Abstract, Figure 14, and Example 8).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the method, wherein the medium includes a superimposed pH gradient of Hearn et al. in the method of Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) in view of Gilmanshin et al., since Hearn et al. state, "The method described in this invention permits large sample loadings of mixture of proteins and other biological substances and the focused zones can

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be easily recovered in high yield without significant loss of biological activity (Column 1, lines 49-53)." By employing scientific reasoning, an ordinary practitioner would have been motivated to combine and substitute the method, wherein the medium includes a superimposed pH gradient of Hearn et al. in the method of Summerton et al. (U.S. Patent 5,405,938) (April 11, 1995) in view of Summerton et al. (U.S. Patent 5,034,506) in view of Gilmanshin et al. in order to improve the process for analyzing a population of oligomeric analyte molecules and also in order to achieve the express advantages, as noted by Hearn et al., of an invention which permits large sample loadings of mixture of proteins and other biological substances and the focused zones can be easily recovered in high yield without significant loss of biological activity.

***Response to Amendment***

10. In response to amendment, previous 102(b) rejection and 103(a) rejections are withdrawn. However, new 102(b) and 103(a) rejections are hereby included.

***Response to Arguments***

11. Applicant's arguments with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D., whose telephone number is (703) 306-5818. The examiner can normally be reached on 7:00 AM-4:30 PM from Monday to Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (703) 308-1119. The fax phone number for this Group is (703) 746-4979. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group LIE Chantae Dessau whose telephone number is (703) 605-1237.

Arun Chakrabarti,

Patent Examiner,

October 1, 2003

  
**ARUN K. CHAKRABARTI**  
**PATENT EXAMINER**

  
**GARY BENZION, PH.D.**  
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